

*L'art de la Renaissance
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Between Text and Image: Incident and Accident in the History of Astronomical and Astrological Illustration

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Art historians who study the iconography of the heavens owe a great debt to the work of scholars such as Aby Warburg, Fritz Saxl, Erwin Panofsky and Jean Seznec, who helped to outline the various stages in the development of the figures of the constellations as these images passed from culture to culture¹. In particular, one should cite Saxl's writings and especially the multi-volume work on mythological and astrological iconography – the *Verzeichnis astrologischer und mythologischer illustrierter Handschriften des lateinischen Mittelalters* – as the touchstone for all studies of the subject². In the set of essays that prefaced the first three volumes of the series, Saxl tackled some of the most complex topics facing the field, making a valuable contribution to our understanding of what happens to images when they migrate across cultural boundaries³.

One concern that united these scholars was that they were all interested primarily in the *Nachleben* of classical culture. Their academic endeavours were focussed largely on those links and connections that could be used to support the concept of continuity and revival. It is a heroic form of research, based on the premise that those aspects of a civilization which are best prevail against all odds.

There are, however, inherent dangers in focussing exclusively on links and connections. The first is the temptation to create false bridges. In the specific context of astrological iconography, the best known example would be Warburg's thesis concerning the figure of the first decan-god in the panel dedicated to the sign of Aries on the east wall of the frescoes of the *Salone dei Mesi* in the Palazzo Schifanoia in Ferrara and its supposed links to the classical constellation of *Perseus*. As the story is so familiar, it does not bear repeating, save to reiterate that Warburg's desire to see this figure as a potent symbol of the rebirth of the classical spirit unfortunately led him towards a series of unsustainable conclusions⁴.

The second and, perhaps, more limiting aspect of focussing exclusively on links and connections is that it nurtures a tendency towards ignoring those periods when error and dissonance predominate. More importantly, one often misses those intellectually exciting occasions when conjecture and invention come to the fore.

Astronomical and astrological manuscripts provide the largest surviving corpus of illustrated secular texts, with over 200 manuscripts dating from the early-9th to the early-16th century. Each manuscript is illustrated with between 30

and 50 individual images. It is a huge body of primary evidence, which, for the most part, has not been adequately studied. In very broad terms, the manuscripts fall into three main textual families: the literary, the mythological and the mathematical. In turn, each of these families generates a different format for illustrations of the constellations.

The literary tradition stems, ultimately, from two, very practical avenues: the need for information to help sailors navigate across the Mediterranean and for reliable data for priests, politicians and farmers to order the religious, civic and agricultural year. Homer's *Iliad* and *Odyssey* and Hesiod's *Works and Days* provide the earliest descriptions of the constellations and serve as an important touchstone for a number of later Greek and Roman authors⁵. The earliest surviving Greek astronomical work, however, is the 1150-line poem by Aratus of Soli, entitled the *Phaenomena* and written at the turn of the 3rd century BC⁶. In it, he describes the appearances and relative positions of 46 constellations and some of their stars⁷. He also defines the location of the great circles (the arctic circles, the Tropics of Cancer and Capricorn, the equator and the ecliptic) in terms of where these circles intersect the figures of the different constellations; and he lists the risings and settings of each of the constellations relative to the then-accepted canon of eleven zodiacal constellations. In short, he provides a poetic overview of how the constellations are arranged on the sphere of the fixed stars.

The text of the *Phaenomena* is the mainstay of the literary tradition of astronomical texts. It became well known to the Latin West, through numerous sources: the 1st-century Latin translations of the poem by Cicero⁸ and Germanicus Caesar⁹, and the 4th-century Latin translation by Rufus Avienus¹⁰. The *Phaenomena* also underpins the astro-mythological material found in the works of a number of later Latin authors, such as Virgil, Columella and

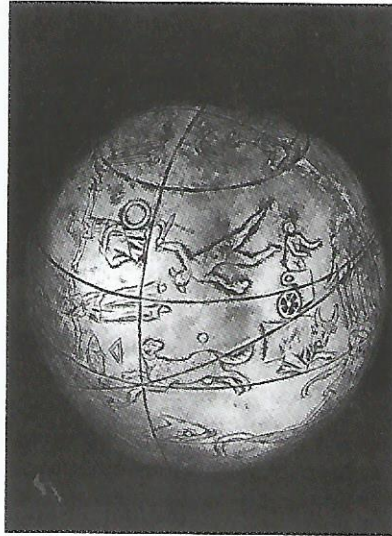


1. *Perseus*, second half 9th century, illuminated manuscript. Leiden, Universiteitsbibliotheek, Ms Voss. lat. 4° 79, fol. 40v.

Virtuvius, and is repeatedly cited as the authoritative source by the Latin encyclopaedists, such as Pliny, Varro and Isidore of Seville. Evidence suggests that there were illustrated versions of the *Phaenomena* during the classical period, but the earliest surviving illustrated manuscripts all date from the 9th century¹¹. In some of the illuminations, such as those found in the Leiden *Aratea*, one can see clear evidence of a stylistic debt, at least, to painting of a late classical prototype¹². But, comparisons between these illustrations and the constellations found on the few examples of genuinely antique sculptural sources suggest that even in antiquity, the Aratean pictorial tradition was not a homogenous one. There seem to have been a number of different pictorial traditions for repre-



2. *Perseus*, c. 1000, illuminated manuscript. London, The British Library, Ms Cotton. Tib. C. I, fol. 22v.



3. *Celestial globe*, 2nd-century, Roman. Paris, Kugel Collection.

senting the figures of the constellations, certainly as early as the 1st century AD and possibly two or three centuries before that¹³. For example, one might consider the difference between the depiction of *Perseus* in the Leiden *Aratea*, where there is a certain level of acknowledgment of the astronomical phenomena underpinning of the figure's form and the placement of the stars within it (fig. 1), and the very odd series of illustrations that accompany the 11th-century English manuscript of Cicero's translation of the *Phaenomena*, where the bodies of the constellation figures are filled with glosses on the texts they purport to be illustrating (fig. 2)¹⁴. It would be tempting to cite the Leiden illustrations as the truer reflection of a classical prototype and dismiss the Ciceronian amalgam all together, were it not for the fact that many of the figures in the Cicero manuscripts are also extremely close to classical models. The depiction of *Perseus*, for example, is clearly reminiscent of the form of *Perseus* one finds on the 2nd-century, Roman celestial globe, currently in the Kugel collection in Paris (fig. 3)¹⁵. Until the classical iconography of the figures of the constellations is fully understood, then, the heritage of these medieval drawings remains equally unclear.

The second great iconographic tradition is the mythological one. Interestingly, Aratus only incidentally mentions the great myths associated with the constellation figures. Instead, it was left to Eratosthenes, the head librarian of the great library at Alexandria in the mid-3rd century BC, to compile a work in which he recounted the mythological fables associated with 45 stellar groupings¹⁶. He also provided a brief description of where the stars were placed in each of the constellations. The work of Eratosthenes influenced the 2nd-century Roman mythographer, Hyginus, whose *Astronomica* was probably the most



4. Engonasin (Hercules), second half 9th century, illuminated manuscript on parchment. Leiden, Universiteitsbibliotheek, Ms Voss. lat. 4^o79, fol. 6v.



5. Engonasin (Hercules), early 9th century, illuminated manuscript. Basel, Öffentliche Bibliothek der Universität, Cod. AN. IV. 18, fol. 14v.

widely-diffused text on astronomy during the early years of the Renaissance¹⁷. Whereas Aratus had focused his attention almost exclusively on describing the constellations as they appeared in the sky, Hyginus highlights the myths associated with each figure and summarizes the placement of the stars within each figure. Accordingly, the illustrated manuscripts of this group tend to represent a variant iconographic tradition that regularly includes more of the iconographic details drawn from the mythological narrative than one tends to find in the earliest manuscripts of the Aratean tradition. Having said that, however, it is not easy to isolate what one might call a «literary iconographic tradition» from a «mythological iconographic tradition» – since, some time during the Alexandrian period, the *Phaenomena* itself had become part of an anthology of Greek astronomical texts¹⁸, which also included abbreviated versions of the catastrophic myths attributed to Eratosthenes. It is still not clear if this Greek anthology was illustrated or what its illustrations looked like, but the later Latin versions of the text certainly have pictures that reflect the iconography of a fuller, mythographic tradition of images. To make the situation even more complicated, this more elaborate iconography also infiltrated itself into the Latin translations of the *Phaenomena*. To cite one example, the text of one of the earliest surviving medieval versions of the Germanicus translation of the *Phaenomena*, the early 9th-century manuscript made in Fulda and now in Basle, is accompanied by *scholia* (the so-called «*scholia Basilensia*»), which provides a good deal of mythological information that is absent from Germanicus's descriptions of the constellations¹⁹. Interestingly, the illustrations in the Basle



6. *Auriga*, second half 9th century, illuminated manuscript. Leiden, Universiteitsbibliotheek, Ms Voss. lat. 4^o 79, fol. 22v.



7. *Auriga*, early 9th century, illuminated manuscript. Basel, Öffentliche Bibliothek der Universität, Cod. AN. IV. 18, fol. 22r.

Aratea manuscript are very different from those that appear in the Leiden *Aratea*, which has no additional *scholia*. The pictures in the Basle manuscript include a number of details that are specifically mythological – that is to say, the illustrations portray features that are not described in Germanicus's text and have no astronomical rationale behind them. For example, if one compares the illustrations of *Engonasin* («the Kneeler») in both manuscripts (figs. 4-5), one can see that the Leiden *Engonasin* is somewhat anonymous, having only his club and a lion's skin over his left arm as an attribute, while the Basle *Engonasin* has developed into the demi-god *Hercules* and is shown battling against a serpent climbing up a tree (presumably, the dragon guarding the apples of the Hesperides). Similarly, the Leiden *Auriga* has only a flail, crown and three small goats climbing on his left arm, while the Basle *Auriga* has the addition of a horse-drawn chariot and wears a soldier's helmet (figs. 6-7). From an astronomical point of view, the constellation figures in the Leiden *Aratea* are closer to the images that can be picked out in the night sky. Astronomically, the constellation of *Engonasin* does not contain a tree and a snake; nor does a chariot appear as part of the stellar configuration of *Auriga*. But, within an iconographic context, both pictures have equal claim as reflections of the «classical tradition». The figure of *Auriga* in the Kugel globe, for instance, also drives a chariot (fig. 3). So, whereas the classical history of the constellations still remains somewhat unclear, one can state with greater conviction that, at the earliest stage of its post-classical re-emergence into pictorial form, the typological boundaries between the poetic and the mythological traditions had already broken down. This may help to explain

why medieval scholars, at least, appear to have been so willing to borrow drawings from what later historians see as one distinct iconographic tradition to act as «illustrations» for another. They had inherited a corpus of material in which those distinctions were not clear. Moreover, they exacerbated the situation by creating new, «authoritative» texts that were, essentially, iconographic hybrids – such as the *De ordine ac positione stellarum* catalogue found in the Carolingian computistical compendia, variously known as the «Compilation of 810», the *Libri computi* or the *Liber de calculationis*²⁰, or in the star catalogue, which is usually referred to as the *De signis caeli*, and was often erroneously attributed to the venerable Bede²¹. As a result, though, it is nearly impossible for modern scholars to create tidy *stemmata* for these constellation manuscripts; and it is extremely difficult to uncover clear classical prototypes from the material that has survived.

Pursuing this overlap of text, commentary and pictures a bit further, it is interesting to consider one particular family of Germanic manuscripts a bit more closely. There are around fifteen illustrated manuscripts from the so-called «O-family» of the Germanic text, the dates of which span from the 9th to the 15th century²². Understandably, these manuscripts vary quite a bit in terms of style, format and the presentation of the text on the page. Nevertheless, they all share a number of textual similarities – the most striking of which is that all these manuscripts are plagued by an identical set of *lacunae* in the second half of the poem. At seemingly irregular intervals, two or three lines of the poem have been cut in 22 different cases²³. In trying to discover if there is any pattern to this recurring feature, it does seem that, in most instances, the cropped verse tends to abut the area in which a picture appears. In one bi-folio opening from the oldest member of the «O-family», Basle AN. IV. 18, where it is possibly to trace the



8. *Lepus*, early 9th century, illuminated manuscript. Basel, Öffentliche Bibliothek der Universität, Cod. AN. IV. 18, fol. 35v.

flow from verse to *scholia* to picture, the missing lines of verse always fall between the bottom of the illustration and the resumption of the poem after the *scholia* (figs. 8-9). For example, on ff. 35v-36r, one sees:

fol. 35v:

scholia: on the constellation of *Lepus* (ending... *singulas sunt septem*.)

illustration: *Lepus*

missing verse (vv. 344-36):

[*At qua cauda Canis languentia desinit astro,
fulgent Argos stellis aplustria puppis;
puppe etenim trahitur, non recto libera cursu*],

verse (vv. 346-350):

*Ut cum decurrens inhiat & iam nauita ren^os
auersamque ratem uatis damnatus ab ore.
perlegat, optatam cupiens contingere terram.
Sed quia pars uiolata fuit, coeuntia saxa.
Numine Iunonis tutus confugit Iason. //*

fol. 36r:

verse (vv. 351-54):

*Haec micat in cęlo lateri non amplior actus.
Quam surgit malus quadeb tr&d reddere*

[*dereproram,*

*Inter cepta perit nulla sub imagine forma
Puppis demisso tantum stat lucida clauo.*

scholia: on the constellation of *Navis* (*Haec beneficio minervae – sub carina.v. summa xiii.*²³).

illustration: *Navis*

missing verse (vv. 355-57):

[*At procul expositam sequitur Nereia Pristis
Andromedam. Media est solis uia, cum tamen illa
terretur monstro pelagi gaudetque sub axe*

verse (vv. 358-461)

*diuerso posita & boreae uicina legenti.
auster Pristis agit duo sidera perlegit unum,
Namque aries supra prist inpiscesque feruntur.
Belua sed ponti non multum praeterit amnem,*

scholia for the constellation of *Cetus* (beginning *Haec est cui Andromeda...*)²⁴.



9. *Navis*, early 9th century, illuminated manuscript, Basel, Öffentliche Bibliothek der Universität, Cod. AN. IV. 18, fol. 36r.

These *lacunae* in the «O family» raise a number of issues. First, there is nothing in the formal presentation of the pages themselves that would alert any but the most assiduous reader that the verse has been seriously mutilated. This in itself may help to explain why this feature of the «O family» continues unchanged for more than 500 years – the earliest evidence we have is the 9th-century manuscript in Basle, but one can see that this dropping of lines re-occurs well into the third quarter of the 15th century. There is no record of whether or not the later humanists knew of the extent to which the poem had been mutilated; but, without a superior version of the poem available, Renaissance scribes – just like the generations of scribes who had gone before them – were left with no alternative but to copy what they had.

If one starts to probe a bit more deeply in the perhaps vain attempt to uncover the cause behind these *lacunae*, the fact that they regularly occur about the areas that have been subsequently filled in with pictures suggests that the lines may have been dropped or, perhaps, erased by someone who wanted to make more room for the pictures. If true, this would mean that the parent manuscript for «O family» was not constructed with full-page illustrations; since, in manuscripts with full-page illustrations, the texts and images exist almost independently of each other. In the Leiden *Aratea*, for example, having the pictures consigned to the verso of each folio and the text to the recto means that if the length of the text runs past the confines of a single side, the corresponding verso is just left blank. In theory, the format is infinitely flexible.

In contrast, the parent of the «O family» must have been constructed according to what Weitzmann has described as the «column picture» format, where the pictures are set within the column of text²⁵. This does not provide any hard evidence concerning the antiquity of the immediate parent of the «O family», but the

habitual dropping of lines points to the likelihood that the format of the «O family» was created during the awkward phase when scribes and illuminators were trying to figure out how to transpose the text, figures and commentary associated with a given work from papyrus rolls to the page-format of an early codex.

One aspect of this transition from roll to codex was that lines of text, which had been contained within relatively narrow columns, were quite often just widened to cover the new breadth of the codex page. As a result, this widening of the text column meant that the space left for the pictures became disproportionately broad²⁶. Indeed, this may be the simple explanation behind the missing lines: the illuminator was handed a page upon which the text had already been written only to discover that his colleagues has left him with insufficient height to copy-in his drawings. In an act of textual vandalism, he merely erased the two to three lines of verse that flanked his «picture space».

The major argument against the suggestion that the missing lines in the «O family» are a result of a simple misjudgment in the transpositions of an existing version of text is the fact that, whereas it was relatively common to have a text interspersed with pictures in the early papyrus rolls, it was much less common to have text, pictures *and* commentary set all together within a single column. Generally, Hellenistic and Alexandrian commentaries tended to be written on separate rolls. The placement of commentaries alongside the text may originate as early as the 1st century BC, but it really does not develop as a fully-fledged form until much later – perhaps sometime between the 2nd and 4th centuries, with the earliest extensive version datable to the 4th century AD²⁷. Therefore, it seems more probable that the problem of the dropped lines in the «O family» of the Germanicus manuscripts is not simply due to problems in transporting like-for-like from one format to another, but that it stems from the more complicated process of *bringing together* the text, pictures and commentary from a number of sources and trying to align them within a restricted, single-column format.

In considering this process more closely, one senses that the tremendous decision to incorporate text, pictures and commentary coming from three different sources into a single-column text could not have rested with a single, ambitious scribe. Instead, it seems more likely that the melding process must have appeared to be a much simpler task to whomever first conceived it and the pictures probably already existed as an integral part of one of the two texts. One is left with two options: either the text of the poem was illustrated and a non-illustrated commentary had to be inserted; or, the scribe had to figure out a way to slip the text of an astronomical poem into a body of commentary which consisted of a star catalogue, descriptions of the myths and illustrations of the constellations.

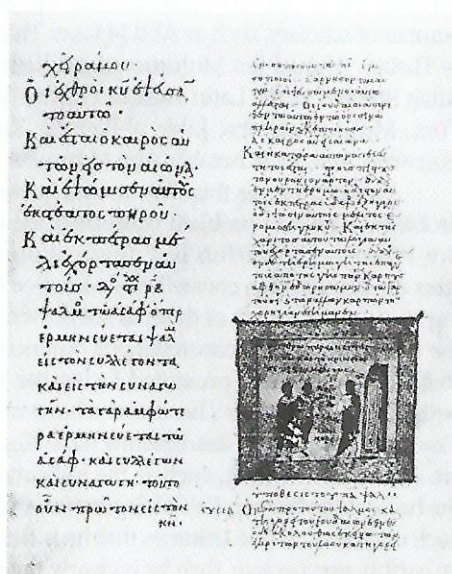
The two clearest indications of which of these options presents a more plausible solution are 1) the previously-mentioned fact that the pictures one finds in the vast majority of manuscripts of the Latin translations of the *Aratea* seem to be more closely related iconographically to the mythographic *scholia* than to the text of the poem itself; and 2) that in the manuscripts of the «O family» of Germanicus manuscripts, it is the lines of verse that have been cut, while the entire length of the *scholia* remains intact.

Considering the melding of these two pieces of text in strictly formal terms – that is, focusing solely on how the pieces would look on a page – it would be an «easier» or, perhaps, «neater» solution for the scribe/illuminator to cut lines of verse than to tamper with prose. Edited prose always leaves straggling ends. But if one had an illustrated poem and was trying to find a way to insert a section of prose commentary, would one cut lines from the existing model to insert the gloss?

This, then, is the crux of the problem. It is extremely difficult for modern readers to support any hypothesis that claims it would have been acceptable to cut lines from a classical poem in order to preserve the integrity of either an illustration or a commentary. For most scholars, «respect for the authority of the text» does not extend to commentaries or illustrations. Many philologists see these aspects of the text as secondary; while a few might maintain that pictures – in particular – are superfluous to any serious reading of a text and are, therefore, a dispensable part of the equation.

In this context, however, it seems worth questioning whether the early readers and writers of this compilation actually did believe that the poem was intrinsically more important or more valuable than either the commentary or the pictures. One possible indication can be gleaned from the writing of the 4th-century author, Lactantius, who quite clearly states that he believed that Germanicus himself was the author *scholia Basileensia*²⁸. Given this, it is easy to imagine how the *scholia* and its illustrations – with their concrete information about the positions of the stars and the forms of the constellations – could have appeared to be as important (if not more important) to a late-antique reader than the Latin translation of some obscure and somewhat rambling Greek poem. In this instance, the commentary and illustrations may have seemed essential, with the poem itself seen merely as a decorative adjunct.

Finally, in answer to the unasked question of whether or not there are other analogous examples from other kinds of texts that might be offered up as some sort of proof that such a proposal might be even be plausible, there are other examples of illustrated *scholia*; indeed; there are examples of manuscripts in which the *scholia* has been illustrated, and the main text has not. The best-known example of the latter appears in a Byzantine psalter in the Vatican, written about 1059, where the text (in the larger script) is accompanied by a series of commentaries, within which a series of framed miniatures have been set (fig. 10)²⁹.



10. Psalter with *scholia*, c. 1059, illuminated manuscript. Città del Vaticano, Biblioteca Apostolica, Vat. grec. 752, fol. 261r.

In this case it is clear: the illustrations form part of the gloss and are presented as such. Nevertheless, there is much more work to be done on this tricky issue of how the literary and mythographical texts and their illustrations came together some time between the 3rd century BC and the 4th or 5th century AD to form the corpus of material that exists at the heart of the earliest surviving manuscripts.

Returning to the main iconographic traditions behind this body of astronomical manuscripts, the third main iconographic tradition is the mathematical one. Although a number of very important scientific writings on the stars have survived, the most influential of these is the astronomical treatise compiled between 127 and 148-149 AD, by the Alexandrian astronomer, Claudius Ptolemaeus: the *μαθηματικὴ σύνταξις* or «mathematical systematic treatise», usually Latinised into *Syntaxis mathematica*, but most commonly known through a Latinised version of its later Arabic title, as the *Almagest*³⁰. In Books VII and VIII of the treatise, there is a complete register of the 1,025 stars visible with the naked eye. In the catalogue, he provides 1) a description of the location of a star within the figure of the constellation 2) its position on the celestial sphere in terms of ecliptical latitude and longitude and 3) its magnitude.

Although there is some evidence that illustrations which may have accompanied early Greek versions of the *Syntaxis mathematica* survived in Byzantium, the text itself seems to have completely disappeared from the Graeco-Roman world with the fall of the Roman Empire. There are no later Greek abridgements of the text; nor were there any attempts to translate it into Latin. Indeed, the survival of Ptolemy's great work is due to the fact that it became one of the cornerstones of Arabic astronomy. Between the 8th and 10th centuries AD, the work was translated and updated by a number of scholars, such as Abū l-Ḥasan Thābit ibn Qurra (known in the Latin West as Thabit), Aḥmad ibn Muḥammad ibn Kathīr al-Farghānī (Alfraganus), Ġābir ibn Aflāḥ (known in the Latin West as Geber), Abū Rayḥān al-Bīrūnī, Nasir ad-Dīn aṭ-Ṭūsī, Muḥammad ibn Jābir al-Battānī, Zakariyā ibn Muḥammad al Qazwīnī (Kazwini), and, most notably, Abū l-Ḥusayn ʿAbd al-Raḥmān al-Ṣūfī (Sufi)³¹.

As fortuitous as this may sound, however, the migration was not without its problems. The first problem concerned the orientation of the constellations in the sky. Whereas Hipparchus had clearly stipulated, in his own writings, that «all the stars are described in constellations from our point of view, and as if they were facing us, except for such of them as are drawn in profile»³², it is difficult to determine the orientation of the constellations outlined in Ptolemy's tables. Some of the constellations are clearly presented facing the viewer. For example, he mentions the both eyes in *Ursa maior's* head, the «chest» of *Cepheus* and the breasts of *Cygnus* and *Cassiopeia*³³. But other descriptions have elements that suggest some constellations are seen from the back, such as the indication of stars in the buttock of *Engonasin*, the back of the human half of *Sagittarius*, the buttock and back of *Aquarius* and the back of *Orion*³⁴. If one assumes that he is describing each of the constellations from an earthly perspective, then he is clearly deviating from the prescriptions set out by Hipparchus – and doing so in an apparently erratic fashion.

In his tables, Ptolemy describes the positions of each of the stars within the constellations using identifying terms, such as «advanced» and «behind» to indi-

cate relative longitude, and he uses «north» and «south» to designate relative latitude. Most importantly, however, he uses the terms «right» and «left» to indicate the side of the body on which the star is placed. This level of detail ensures that virtually any reader has been supplied with sufficient information to map each of the constellations in the night sky or on the solid globe, which Ptolemy himself describes in some detail in his chapter on the construction of globes³⁵.

In the illustrated Arabic manuscripts of Ptolemy's text, the stellar tables are accompanied by two sets of illustrations. In both of these, the figures are depicted facing the viewer (fig. 11). In the first view, the position of the stars conform with the prescriptions stipulated by Hipparchus; namely, that all the constellations in the sky should be configured as if they were facing towards the earth. Moreover, the positions of the stars in the first set of figures co-incides with the Ptolemaic descriptions. In the second set of figures, however, the constellations are presented in mirror image, with «right» and «left» having been exchanged. It appears that the first set of illustrations were to be used when the reader wished to compare the descriptions to the actual night sky. The second view is often called the «globe view», because it records how the stars appear when placed on the surface of a celestial globe, with «right» and «left» having been transposed. On almost all extant Eastern celestial globes, the constellations drawn around the stars are presented using this «mirror view»³⁶. Whereas this clever construction must have had its uses, it creates problems because the «right/left» designations stipulated by Ptolemy's descriptions have become reversed in the «mirror» or «globe» views of the constellations. For example, Ptolemy describes the constellation of *Perseus* as having a nebula on his right hand and the head of Medusa (or



11. *Perseus*, 13th century, illuminated manuscript. London, The British Library, Ms Or. 5323, fol. 21v.



12. *Perseus* (globe view), 13th century, illuminated manuscript. Paris, Bibliothèque de l' Arsenal, Ms lat. 1036, fol. 10r.

ra's al-ghūl, «the demon's head», as the Arabic translators called it) in his outstretched left hand. In the Arabic «globe view» of *Perseus*, however, the nebula is on *Perseus's* left hand, and the Medusa's head is shown held in his right hand (fig. 12).

By-in-large, Graeco-Roman astronomers had decided that the relationship between the longitudinal designations of «advanced» and «following» and the descriptions of «right» and «left» used by authorities, such as Ptolemy, should be maintained regardless of whether one was creating a two-dimensional celestial map showing the constellations as seen in the sky or a three-dimensional globe. As the stipulations of Hipparchus testify, they seem to have developed a convention very early on stipulating that when constellations are being represented as if seen from a terrestrial perspective, they are shown face-on. Following this logic, the constellations on a celestial globe should also be depicted as if they are facing inwards, towards the centre and towards earth. Since one sees the surface from an extra-celestial perspective, or from outside the sphere of the fixed stars, the figures on a globe should be shown with their backs to the viewer. It is only by using this method that Graeco-Roman astronomers could ensure that a constellation figure holding an attribute in his left hand when viewed in the sky, maintains the attribute in his left hand when he is depicted on the surface of a celestial globe. The best-known example of a classical celestial globe is the one held by the Farnese *Atlas*, where the constellations are almost all depicted with their backs towards the viewer, from «the outside»³⁷. The figure may have been «flipped» so that it appears to face a different direction, but the designations of the longitudinal clues of «advanced» and «following» and the stipulations of «right» and «left» relative to the figure remain unchanged.

The unanswered question behind this peculiar shift in the understanding of how the «globe view» of a constellations should be constructed is whether it is a peculiarly Eastern development or if, perhaps, the impetus for this change came from an inconsistency in the classical tradition itself. The likelihood of this latter possibility is supported by the fact that two other antique celestial globes – the aforementioned Kugel globe in Paris and the small, late Roman celestial globe in Mainz – both show a number of the constellations figures from the front³⁸. Indeed, considering the way in which the attributes held by so many of the constellation figures in the medieval manuscript illustrations seem to switch from one side to another, one wonders if the tradition of «mirror-image» constellation might not have a classical provenance – despite the Hipparchan contravention. If so, it may be possible that the illustrations that, hypothetically, accompanied antique versions of Ptolemy's text may have contained «mirror-image» globe-views of the constellations, which, in turn, were merely copied during the Arabic astronomical renaissance of the 8th and 9th centuries. The current state of research does not yet allow scholars to understand the genesis of the admittedly bizarre development of «mirror-image» constellations. Common sense, however, suggests that it not the kind of feature that an extremely diligent Arabic scholar, such as al-Ṣūfī, would have invented. Nevertheless, there does seem a certain degree of perversity in the Arabic maintenance of an iconographic feature that is astronomically non-sensical and contrary to the text which it purports to illustrate –

unless, of course, these illustrations were part of the classical corpus and were maintained specifically due to their authoritative status.

A second problem in the Arabic translations of Ptolemy's work arises from the fact that a number of the Greek constellations were named after prominent characters in Greek mythology. As most Arabic scholars had lost contact with the iconography of the Hellenistic myths, names such as *Cepheus*, *Andromeda*, *Cassiopeia*, *Perseus* and *Orion* meant nothing. To solve this short-coming, the translators either made up names to suit the pictures or they slightly altered the names to coincide more closely with some of their own, indigenous constellation names. The constellation *Cepheus*, for example, is re-named *al-multahib*, or «the one who burns» because the Arabic translators misunderstood the significance of the conical shape of the hat he wears, which Ptolemy describes as a *tiara*. Instead, they thought it represented a flame coming from the figure's head³⁹. Indeed, many late illustrations of the Arabic *Cepheus* show him with a flaming head. Similarly, *Boötes* was called *aş-şayyāh*, «the Shouter» on account of a misunderstanding of the Greek etymology of the figure's name⁴⁰; and *Orion* is referred to as *al-gawzā*, «the Violent Giant»⁴¹. The constellation of *Andromeda*, which the Arabic authors variously called «the chained woman» or «the woman who waits for her husband»⁴² happened to co-incide with a place in the heavens occupied by an ancient Bedouin constellation of a shoal of fish. As a result, many Arabic manuscripts illustrate a whole series of *Andromedae*, some in chains, some with fish on their bellies and some with fish between their feet (fig. 13)⁴³.

In the 12th century, the Arabic version of Ptolemy's star catalogue became available to the Latin West through translations by Gerard of Cremona and the scholars attached to the court of Alfonso X el Sabio of Spain. At this point, for the first time since antiquity, all three iconographic traditions were available in the Latin West – the literary, the mythological and the scientific – each, however, had developed in its own idiosyncratic way during the intervening centuries.

In the earliest extant manuscripts of the Latin translations of the *Almagest*, for example, the Arabic flavour of the illustrations is unmistakable⁴⁴. Furthermore, the names of the constellations remain close to their Arabic models: *Cepheus* is called «inflamatus», *Boötes* is «vociferans» or «ululans», *Orion* is «sublimator» or «audax» and *Andromeda* keeps



13. *Andromeda*, 15th century, illuminated manuscript.
Paris, Bibliothèque nationale de France,
Ms arabe 5036, p. 100.

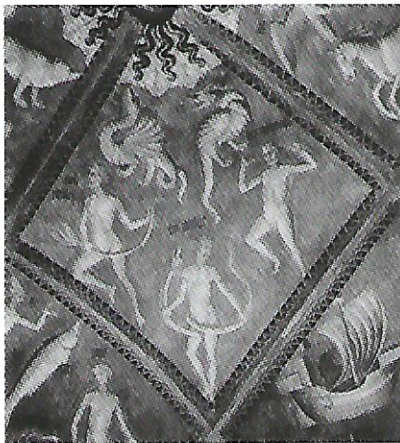


14. *Andromeda*, 13th century, illuminated manuscript. Paris, Bibliothèque de l'Arsenal, Ms lat. 1036, fol. 17v.



15. *Cepheus (inflammatus)* and *Boötes (ululans)*, 2nd half 15th century, illuminated ms. Bergamo, Biblioteca Civica Angelo Mai, Σ. II. 2, fol. 92v.

her fish (figg. 14-15). The influence of this iconographic tradition was widespread and long-lived. More than 60 late-medieval and Renaissance manuscripts contain what might be called «Arabic elements» in their illustrations. Arabic elements can also be found in numerous large-scale astrological cycles, such as the 15th-century frescoes from Roccabianca in northern Italy (figs. 16-17), where *Cepheus* is «inflammatus» and *Boötes* is «vociferans»⁴⁵.



16. Astrological vault with *Cepheus (inflammatus)*, 1458-1464, fresco. Milano, Castello Sforzesco, Camera di Griselda (from Castello at Roccabianca).



17. Astrological vault with *Boötes (vociferans)*, 1458-1464, fresco. Milano, Castello Sforzesco, Camera di Griselda (from Castello at Roccabianca).

Perhaps not surprisingly, though, evidence suggests that only a few of the medieval scholars who copied these texts and pictures from the *Almagest* understood how these exotic images were related to the constellation figures they had inherited from Aratus and Hyginus. There are only a few instances in which one sees the Latin scribes adding marginalia explaining that the figure, whom the Arabs had called «he who jumps», is actually the same as the classical constellation of *Hercules* (fig. 18)⁴⁶. In some cases, though, the line between model and product had become hopelessly tangled. For example, in one set of Latin stellar tables, a figure of purporting to be *Hercules* is also called «*deferens caput algol vel gorgonis*», which should be connected to the description of the constellation of *Perseus*. The page has two illustrations: the first is of a man holding the decapitated head of a bearded male figure and the second one is a nude male figure kneeling to the right, with a flayed human skin draped over his outstretched right arm (fig. 19)⁴⁷.

One particularly bizarre example involves the constellation of *Lyra*. In the classical sources, the constellation of *Lyra* is described as the musical instrument created by the infant Hermes/Mercury, whose sounding box was fashioned from



18. *Hercules*, 1379, illuminated manuscript. Città del Vaticano, Biblioteca Apostolica, Vat. lat. 8174, fol. 18r.



19. *Hercules* and *Auriga*, c. 1425. Catania, Biblioteca comunale, Ms 87 (int. 87), fol. 9r.

a tortoise shell and the strings of which were held tight by ox horns attached to the top of the shell⁴⁸. In his description of *Lyra*, Ptolemy specifically mentions «the bright star on the shell, which is called Lyra», two stars lying where the horns are attached to the shell and the bridge of the instrument⁴⁹.

In their translations of these passages, the Arabic scholars provided three different versions of their understanding of the constellation:

- One is the simple transliteration from Greek to Arabic. The Greek word for «lyre» (λύρα) becomes *lūrā* or *al-lūrā* with the addition of the definite article. This term is then transliterated again by the Latin translators of the text and one finds the constellations named as *allore*, *alore*, *aliore* and *allyore*⁵⁰.

- The second represents the Arabic identification of the constellation with their name for the bright star α Lyr. The Arabs knew this star as *an-nāsr al-wāqīʿ*, «the swooping or falling eagle (or vulture)». When this passage is later translated from Arabic into Latin, the constellation becomes known as *vultur cadens*⁵¹.

- And, in the third version, the constellation is referred to as *as-sulahfāh*, or «the tortoise», which, in the Latin translations, is rendered as *testudo*⁵².

One is a simple transliteration, one an amalgamation and one a mythologically-generated image. It seems straightforward; but when one returns to Gerard of Cremona's Latin translation of the Arabic version of Ptolemy's text, a very strange phrase appears. Ptolemy's original description of the bright star, α Lyr, as «the bright star on the shell, called Lyra»⁵³, appears in Gerard's text as: *lucida super pupillam deferentem et dicitur allore et est vultur cadens* («the bright star above the *pupilla deferens*, which is called "allore" and is "the falling eagle"») ⁵⁴. Numerous scholars of the *Almagest* have puzzled over the meaning of the term *pupilla deferens*, which can be translated, literally, as «the holding or carrying pupil». For example, Ideler offered the ingenious explanation that the phrase *an-nāsr al-wāqīʿ* had become deformed during one of its peregrinations through a local Turkish dialect (where «eagle» became transformed into «pupil») and that the meaning of the phrase is clear when one combines this fact with a medieval interpretation of the word *deferens* indicated «falling». According to Ideler, the phrase *pupilla deferens* should be understood as nothing more than a slightly eccentric version of «the falling eagle» (*vultur cadens*)⁵⁵. Tallgren, however, felt that Ideler's reading of *pupilla deferens* was «le plus exorbitant des non-sens»⁵⁶. Tracing the different meanings that the Arabic translators gave to the Greek word *ὀστράκον* (*ostrakon*, or «shell»), Tallgren observed that there seemed to be four main possibilities: 1) a shell; 2) the sounding box of a musical instrument; 3) a fragment of pottery and/or 4) some sort of hanging support, like a lug. It is precisely this multiplicity of meanings in the Arabic sources that seems to be the root cause of the confusion that leads, ultimately to *pupilla deferens* – or, as Tallgren describes it, «cette expression absolument bizarre»⁵⁷. Tallgren further disagreed with Ideler's readings, arguing that one must read *deferens* in terms of the meaning it is given elsewhere in the *Almagest*. In the descriptions of the constellation of *Perseus*, for example, the hero is described as *deferens caput Algol* («the bearer of the head of the demon», Medusa). So, *pupilla deferens* must be translated as «the holding or carrying pupil», which, sadly, still makes no sense.

In 1974, however, Paul Kunitzsch provided the most plausible explanation for the appearance of *pupilla deferens*⁵⁸. He noted, as Tallgren had, that some of the Arabic translators translated Ptolemy's description of the tortoise shell from which Hermes constructed the first lyre, ὀστράκον (*ostrakon*, or «shell»), as *al-khazaf* or *al-khazafa*, «an earthen vessel» or «a fragment of an earthen vessel». The word *ostrakon* can be used to refer to ceramic *spolia* and, indeed, a version of the term is often used even today in writings about the findings on archaeological sites. In order to strengthen this particular meaning, however, the Arabic translators of the 8th and 9th centuries added the element of *al-hāmila* to the phrase,

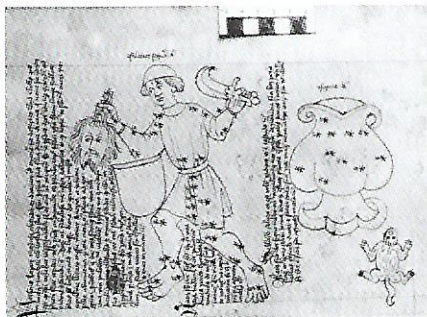
to indicate that this was the kind of earthenware jug with a handle that you could use hold or carry the jug. This observation is supported by the fact that several of the illustrated Arabic stellar tables show *Lyra* as a kind of vase, with one or two handles (fig. 20). Unfortunately, in the Arabic version of the text that Gerard of Cremona inherited, the word *al-khazafa* had become corrupted into *al-ḥadaqa*, which has only one meaning – «pupil». Confronted with the phrase *al-ḥadaqa al-hāmila*, Gerard duly translated it as *pupilla deferens*, or the «the pupil with handles (i.e.: so that it can be carried)».

This raises an interesting question: what do translators do when they confront a term, such as *pupilla deferens*, that appears to be nonsense? As one might suspect, most often, they copy the nonsensical phrase and leave it at that. Indeed, as one scholar has pointed out, it is only in the Spanish translations of the *Almagest* directly connected to the patronage of Alfonso X el Sabio that one can find any attempt to rationalise this odd phrase⁵⁹. In one of the Alfonsine manuscripts, *pupilla deferens* is translated as *la quel es enel oio del galapago* («[the star] which is in the eye of the tortoise»), with the *pupilla* being seen as the eye of the turtle from whose shell Hermes constructed the Lyre. In another, the pupil becomes *le quel es enel oio del lavador* («that which is in the eye of the carrier») – with *deferens* interpreted as the eagle (from *vultur cadens*) who carries a lyre.

As for the illustrations which stem from this series of somewhat nonsensical words, some are straightforward in their depictions of *Lyra* as a lyre, turtle or



20. Lyra, late 16th century, illuminated manuscript. Istanbul, Library of Perter Paşa, Ms 375, fol. 32v.



21. *Perseus and Lyra*, 15th century, illuminated manuscript. Catania, Biblioteca comunale, Ms 87 (int. 87), fol. 8r.

a falling bird. But others are very odd, indeed, such as those which show the constellation as a small mammal (fig. 21)⁶⁰, a kind of gila monster (fig. 22)⁶¹, a bat⁶², a heraldic chicken⁶³ or, trying to be inclusive, as a falling bird, harp, lizard and a hen with her chicks all at once (fig. 23)⁶⁴.

From an extended study of these illustrated astronomical texts, one thing becomes clear. Possibly due to the complete absence of the scientific astronomy in the Latin West from about the 3rd to the 12th centuries AD, the study of these texts became the responsibility of the grammarians – the people who were studying the great texts of antiquity because they had an interest in the language of the ancients.

As grammarians regularly recorded their views in marginalia and commentaries, it is often possible to trace their thought processes. For example, one particularly intriguing version of the constellation of *Andromeda* can be found in a family of manuscripts whose illustrations must all derive from a common model. In this case, it seems as though some extremely clever early-Renaissance philologist – though perhaps not as familiar with his Graeco-Roman mythology as he



22. *Ursa maior, Ursa minor, Draco, Vultur cadens, Gallina volans, Corona borealis and Delphinus (?)*, first half 15th century, illuminated manuscript. Basel, Öffentliche Bibliothek der Universität, Ms F. II. 33, fol. 38r.



23. *Boötes, Corona borealis, Hercules (twice), Lyra (4 times) and Cassiopeia*, 1426, illuminated manuscript. Città del Vaticano, Biblioteca Apostolica, Pal. lat. 1368, fol. 51v.



24. Pegasus and Andromeda, c.1450, illuminated manuscript. Paris, Bibliothèque nationale de France, Ms fr. 612, fol. 104r.

might have been – thought that the name of *Andromeda* was derived from the Greek word for «man» (ἄνθρωπος, ἄνδρoς) and duly amplified the text he was copying with the image of a male *Andromeda*. Lest the brilliance of this etymological discovery go unnoticed, he contrived an illustration showing the figure with its skirt lifted in such a way that «her» male genitalia was clearly visible (fig. 24). Surprisingly, the innovation of a hermaphrodite *Andromeda* caught on and became quite influential. Indeed, there are nearly a dozen examples of the hermaphrodite *Andromeda* in manuscripts dating well into the third quarter of the 15th century⁶⁵.

Another, not dissimilar, example of textual tinkering can be cited to explain one aspect of the astronomical iconography of the frescoes in the *Salone dei Mesi* in the Palazzo Schifanoia

in Ferrara (fig. 25), where *Aries*, the Ram, is shown running to the left and placed within a large, golden triangle. The representation of a running or leaping Ram falls easily within the iconographic traditions associated with the constellation and can be related to descriptions of the animal in which its feet are placed on the celestial equator. As the authors explain, *Aries* is placed on the equator, so it has to travel a greater distance with each celestial revolution than any of the other constellations that are placed nearer to the celestial poles⁶⁶. There is nothing in the descriptions of the figure itself, however, which helps to explain the large triangle.

Instead, the answer to this puzzle lies in a mistake in the transcription of a phrase describing the constellation in one small family of Italian manuscripts. Aratus, apparently following Eudoxus, describes the constellation of *Aries* as «faint and starless» when the Moon is bright, but he adds that it can be easily



25. Francesco del Cossa, *Aries within a triangle*, 1468-1470, fresco. Ferrara, Palazzo Schifanoia, *salone dei Mesi*.



26. *Aries* and *Deltoton/Triangulum*, second half 15th century, illuminated manuscript. Milano, Biblioteca Trivulziana, Ms N. 690 (E. 83), fol. 17v.



27. *Aries* and *Deltoton/Triangulum*, second half 15th century, illuminated manuscript. Bologna, Biblioteca comunale, dell'Archiginnasio, Ms A. 173, fol. 17r.

located in the heavens by its proximity to the bright stars in the girdle of *Andromeda* and the stars of the constellation *deltoton*, the Triangle, which are found a little to the north of the Ram⁶⁷. Hipparchus, in his commentary on the *Phaenomena*, counts this characterization of the stars of *Aries* as further proof of the general deficiency of Aratus's astronomical knowledge since, as Hipparchus explains, the three stars in the head of *Aries* are much brighter than any of the stars which form either *Andromeda's* girdle or the *deltoton*⁶⁸. Despite this, however, the idea that the *deltoton* appears in the sky as a signifier of the constellation of *Aries* survives in the astronomical literature, primarily, it seems, because the astrological myths supporting this description had already become established⁶⁹.

Astronomically, *deltoton* appears in the night sky to the north, or «above» the Ram, or as Hyginus describes it in Book III of his *Astronomica*, *Aries* is «infra Triangulum»⁷⁰. Curiously, in a number of late-14th and 15th-century manuscript texts, the preposition *infra* is inconsistent, with the word often being mis-transcribed so that the «f» of *infra* turns into a «t». Hence, the phrase now reads «intra Triangulum». And, with a slip of the pen, the figure of the Ram is no longer below the Triangle, he is inside it. As evidence of the fact that at least some illuminators read the texts they were supposed to be illustrating, the image of the Ram changes in the majority of the Hyginus manuscripts preserving this reading. In these versions, the head of the Ram is now neatly placed within the three sides of the triangle (fig. 26)⁷¹. This new image of the *deltoton*-bearing Ram becomes sufficiently authoritative to influence a number of

15th-century humanist authors, such as Matteo Palmieri, Leonardo Dati and Basinio da Parma⁷². Basinio da Parma is particularly interesting in connection to the Schifanoia frescoes in Ferrara, since he actually spent many of his formative years there: first studying Latin with Guarino da Verona (when he is described, in documents dating from 1448-1449, as a *magister*, *grammaticus*



28. Scorpio, Boötes and Virgo, early 9th century, illuminated manuscript. Paris, Bibliothèque nationale de France, Ms lat. 12957, fol. 65v.



29. Ophiuchus, Serpens, Scorpio, Boötes, Virgo and Gemini, 14th century, illuminated manuscript. Città del Vaticano, Biblioteca Apostolica, Reg. lat. 1324, fol. 28v.

and, even, a «maistro de poitria») and, then, studying Greek under the tutelage of Theodore Gaza⁷³. Basinio's dependence on the Hyginian text for his own astrological poem, the *Astro-nomica*, has long been recognised⁷⁴; but now one can see that he must have read a version of Hyginus's text in which the variant reading of «intra Triangulum» appears. For, in Basinio's description of Aries and the *deltoton*, the text reads as follows: «Primum Aries signum est... / caputque novum magni quod magna Trigoni / forma tegit»⁷⁵.

And, not surprisingly, all but one of the illustrated manuscripts of Basinio's poem preserve the variant Aries «intra Triangulum» (fig. 27)⁷⁶. From this, it seems safe to conclude that the Schifanoia image and Basinio's triangle-wearing Ram both derive from the variant version of Hyginus's text that was circulating in Ferrara during the late 1440s and 1450s.

Most often, however, iconographic variants arise not from close textual consultation and clever invention, but from relative ignorance. Many of the people who illustrated manuscripts during the middle ages were barely literate. They took their clues from the pictures, rather than from the words. For example, in a 9th-century manuscript of the *Revised Aratus latinus*, the illuminator interprets the cloak that Boötes's wears draped over his right shoulder as a wing (fig. 28), and this mistake is duly copied for over 600 years (fig. 29)⁷⁷. With the constellation of Pegasus the position of the horse's head against his wing, such as one sees in the Aberystwyth *Aratea* (fig. 30)⁷⁸, seems to have baffled generations of illuminators, some of whom transform the image so that Pegasus is depicted biting his own



30. Cassiopeia, Andromeda and Pegasus, early 11th century, illuminated manuscript. Aberystwyth, National Library of Wales, Ms 735 C, fol. 38v-39r.

touches both the arctic circle (*Arctophylax. Huius manum sinistram circulis arcticus includit ita*) and the constellation of Corona borealis, the Northern Crown (...*coronam humero sinistro prope contingere Arctophylax videtur*)⁸¹, by splitting the upper and lower contours of *Boötes*'s arm. The top contour of the arm rises up the page so that it *Boötes*'s hand rests on the lower edge of the arctic circle, which contains *Draco* and

wing or even eating out of a bowl (figs. 31-32)⁷⁹.

As a final example of instances in which the illuminators of these manuscripts seem to be reading their texts, one particularly delightful, but perhaps slightly less elegant, interpolation of *Boötes* appears in the 12th-century, French or Italian Hyginus manuscript, now in Baltimore (fig. 33)⁸⁰. Here the illuminator has cleverly combined the textual stipulations that the hand of *Boötes*,



31. Cassiopeia, Andromeda, Pegasus, Aries and Delton/Triangulum, end 10th/early 11th century, illuminated manuscript. Dijon, Bibliothèque municipale, Ms 448, fol. 69r.



32. Pegasus and Aries, 12th century, illuminated manuscript. Klosterneuberg, Stiftskirche, Ms 685, fol. 77v.



33. Boötes with the Arctic Circle and *Corona borealis*, 12th century. Baltimore, Walters Art Gallery, Ms W. 734, fol. 5v.

the two Bears. The lower contour of his arm runs along the bottom of the page, coming to rest on one of the tendrils of the leafy crown⁸².

And what of the positions of the stars in these manuscript illustrations? Since most of the surviving illustrations are ultimately derived from the rudimentary astronomical descriptions of Eratosthenes, via Hyginus or one of the later Latin encyclopaedists, the positions of the stars themselves reflect a very basic, non-scientific tradition that predates Ptolemy by 500 years or more. Add to this all the kinds of errors that inevitably develop when lists are copied and re-copied for a period of over 1,200 years and the result is rather dismal. In fact, one might go so far as to suggest that it would have been impossible for any late-medieval or early Renaissance scholar to

understand the arrangement of the constellations in the night sky if all he had at his disposal was a library stocked with manuscripts of this sort. Even when it comes to the representations of the heavens on scientific instruments (such as one sees on astrolabes) the incidence of mistakes, mis-transcriptions, transpositions, failures to recalibrate to take account of the precession of the equinoxes and the introduction of groups of so-called «ghost stars» (or stars that are given quite specific celestial co-ordinates in the texts that, when checked, correspond to a completely blank section of the sky)⁸³ – one really does begin to marvel at the heroic spirit of the *Nachleben der Antike* that was able, despite the odds, to keep these traditions alive for more than 3,000 years.

Ironically, though, it is not ignorance, laziness, a lack of intellectual curiosity or mistakes in Latin grammar that threatens to signal the end of this glorious tradition. Instead, the constellations themselves were dealt a mortal blow by the improvements in star mapping that took place during early 19th and 20th centuries. If one individual were to be named, it would be John Cary, the London-based globemaker, who, in 1817, began to publish his celestial globes in two formats⁸⁴. For the humanist, he published a globe which continued to include the figures of the constellations. For



34. John Cary, *Celestial globe*, 1817, without constellation figures.

the «scientist», however, he published a globe in which these figures were eliminated and little schematic diagrams were inserted in their stead (fig. 34). The real death knell, however, sounded in 1928 at the meeting of the International Astronomical Union, held in Leiden, where it was decided that the traditional figures of the constellations would be abandoned and heavens neatly re-divided into 100 geometrical plots, whose contours were based on parallels and hour-lines. As a result – very sadly – the modern astronomer’s understanding of the mythical figures that once ruled the heavens is probably now vaguely comparable to that of the dimmest scribe trapped in the darkest corner of medieval Europe and the *Nachleben der Antike* in this rich and rewarding field is now closer to becoming extinct than at any other time in its 3,000-year history.



Notes

Some of the material in this paper has been drawn from a larger, collaborative work soon to be published by Elly Dekker and me on the iconography of the heavens from antiquity to the Renaissance.

1. See, for example, A. Warburg, *Gesammelte Schriften. Die Erneuerung der heidnische Antike. Kulturwissenschaftliche Beiträge zur Geschichte der europäischen Renaissance*, ed. G. Bing, Leipzig/Berlin, 1932. The essays and notes have been translated into Italian by E. Cantimori (A. Warburg, *La Rinascità del paganesimo antico. Contributi alla storia della cultura*, ed. G. Bing, Florence, 1966) and into English by D. Britt (A. Warburg, *The Renewal of Pagan Antiquity: Contributions to the Cultural History of the European Renaissance*, Los Angeles, 1999). For Saxl's articles, see F. Saxl, *Lectures*, ed. G. Bing, London, 1957 and F. Saxl, *La fede negli astri. Dall'antichità al Rinascimento*, ed. S. Settis, Turin, 1985. Bing's volume was re-edited and republished as *A Heritage of Images. A Selection of Lectures by Fritz Saxl*, eds. H. Honour and J. Fleming, London, 1970, which was translated into Italian as *La storia delle immagine*, ed. E. Garin, Bari, 1965. For Panofsky, see especially E. Panofsky and F. Saxl, «Classical Mythology in Medieval Art», *Metropolitan Museum Studies*, IV, 1933, 2, pp. 228-280. For Sez nec, see Jean Sez nec, *La survivance des dieux antiques. Essai sur le rôle de la tradition mythologique dans l'humanisme et dans l'art de la Renaissance*, London, 1940 (English transl.: *The Survival of the Pagan Gods: The Mythological Tradition and its Place in Renaissance Humanism and Art*, transl. by B.F. Sessions, Princeton, 1953).

2. See F. Saxl, *Verzeichnis der astrologischer und mythologischer illustrierter Handschriften des lateinischen Mittelalters in römischen Bibliotheken*, Heidelberg, 1915; F. Saxl, *Verzeichnis der astrologischer und mythologischer illustrierter Handschriften des lateinischen Mittelalters der National-Bibliothek in Wien*, Heidelberg, 1927 and F. Saxl and H. Meier, *Verzeichnis der astrologischer und mythologischer illustrierter Handschriften des lateinischen Mittelalters in englischen Bibliotheken*, London,

1953. The fourth volume in the series was begun after Saxl's death, but clearly drew upon his previous work and from the ethos of the first three volumes. See P. McGurk, *Catalogue of Astrological and Mythological Illuminated Manuscripts of the Latin Middle Ages, IV, Astrological Manuscripts in Italian Libraries (other than Rome)*, London, 1966.

3. The prefaces of the first three volumes have been translated into Italian by F. Cuniberto in F. Saxl, *La Fede*, *op. cit.*, pp. 155-161 and 467; pp. 413-420 and 483-485; and pp. 265-273 and 471-473.

4. For additional information and a resumé of the literature, see K. Lippincott, «Gli deidecani del Salone dei Mesi di Palazzo Schifanoia» in *Alla corte degli Estensi. Filosofia, arte e cultura a Ferrara nei secoli XV e XVI* (atti del convegno internazionale di studi, Ferrara, 5-7 marzo, 1992), ed. M. Bertozzi, Ferrara, 1994, pp. 181-197 and K. Lippincott, «Urania redux: An overview of Aby Warburg's writings on art and astrology» in *Art History as Cultural History: Warburg's Projects*, ed. R. Woodfield, Amsterdam, 2001, pp. 151-182, esp. pp. 159-165.

5. See especially Homer, *Iliad*, XVIII, 483 ff. and *Odyssey*, V, 269 ff. and Hesiod, *Works and Days*, *passim*.

6. The bibliography on both Aratus's original Greek poem and its numerous Latin translations is too extensive to cite here. The reader is directed to E. Maass, *Aratea*, Berlin, 1892; E. Maass, *Commentariorum in Aratum Reliquiae*, Berlin, 1898 (repr. 1958); J. Martin, *Histoire du texte des Phénomènes d'Aratos*, Paris, 1956 and to the two most recent annotated editions and translations of the text: Aratus, *Phaenomena* (Cambridge Classical Texts and Commentaries, 34), ed. and English transl. by Douglas Kidd, Cambridge, 1997 and Aratos, *Phénomènes*, ed. and French transl. by J. Martin, Paris, 1998.

7. The constellation of *Libra* is not recognised by Aratus, who includes its stars as part of *Scorpio*. The Ptolemaic constellation *Equuleus* is not mentioned, either. Aratus calls the group of stars near the forefeet of *Sagittarius* «the circled ring» (περιηγέες), suggesting that the constellation now known as *Corona Meridionalis* did not yet have a name (*Phaenomena*, v. 401).

8. See Cicero, *De natura deorum*, ed. and English transl. by H. Rackham, Cambridge MA and London, 1993, esp. pp. 222-231 and *Aratea*, *Fragments poétiques*, ed. J. Soubiran, Paris, 1981.
9. See *Germanici Caesaris Aratea cum scholiis*, ed. A. Breysig, Berlin, 1867; Germanicus, *Les Phénomènes d'Aratos*, ed. A. Le Boeuffle, Paris, 1975 and D.B. Gain, *The Aratus Ascribed to Germanicus Caesar*, London, 1976.
10. See *Rufi Festi Avieni Carmina*, ed. A. Breysig, Leipzig, 1882 and Avienus, *Les Phénomènes d'Aratos*, ed. J. Soubiran, Paris, 1972, esp. pp. 158-195.
11. For recent overviews of these early manuscripts, see M. Haffner, *Ein antiker Sternbilderzyklus und seine Tradierung in Handschriften vom frühen Mittelalter bis zum Humanismus. Untersuchungen zu den Illustrationen der 'Aratea' des Germanicus*, Hildesheim, 1997 and D. Blume, «Gli astri e gli dèi: astronomia, astrologia e iconografia dai Greci all'Europa medievale» in *I Greci. Storia, cultura, arte, società*, III. *I Greci oltre la Grecia*, ed. S. Settis, Turin, 2001, pp. 861-888.
12. Leiden, Universiteitsbibliotheek, Voss. Lat. 4° 79 (made in Aachen, c. 816). See B. Bischoff, B. Eastwood, T. A. P. Klein, F. Mütterich and P. F. J. Obbema, *Aratea. Kommentar zum Aratus des Germanicus*, Ms. Voss. Lat. Q. 79, *Bibliotheek der Rijksuniversiteit Leiden*, Lucerne, 1989. The manuscript has two closely-related «copies» in Boulogne-sur-Mer, Bibliothèque municipale, Ms 188 (made in St. Bertin at the end of the 10th century) and Bern, Burgerbibliothek, Ms 8 (11th century). Haffner suggests that the illustrations found in this family of manuscripts come from a 4th-century model, derived from a 3rd-century Alexandrian prototype (see Haffner, *op. cit.*, pp. 75 ff). The illustrations in a later, 12th-century, southern Italian manuscript, Madrid, Biblioteca nacional, Ms 19 (A. 16) belong to the same tradition (note the common device of a simple frame on all of the pictures and the way in which the figures lack mythological attributes), but the text and the pictures are derived from a slightly different source.
13. If one solely considers four main classical sources for astronomical information (Aratus, Hipparchus, Ptolemy and Hyginus),

it is clear that there are significant differences in the shapes of the constellations and the assignment of stars to different parts of these figures during the Graeco-Roman period (roughly, 4th century BC to 2nd century AD). Furthermore, none of these textual sources tally completely with the information provided by the few extant visual sources from the period. For additional information, see the forthcoming work by Dekker and Lippincott (as in the prefatory note, above).

14. See London, BL, Harley Ms 647; London, BL, Cotton Ms Tib. C. I and the similar depiction of the frontal *Perseus*, whose body is filled with script, in the 15th-century manuscript in Gottweig, Stiftsbibliothek, Ms 146. See also, *De Hygini Memoria scholiis in Ciceronis Aratum Harleianis servata scriptis scholia apparatus critico et notis instructa et catalogum stellarum [...]*, ed. by G. Kauffmann, Breslau, 1888.

15. See A. Kugel with K. van Cleempoel and J. C. Sabrier, *Spheres. The Art of the Celestial Mechanic*, Paris, 2002, esp. pp. 22-27.

16. Eratosthenes original prose work, the *Catasterismi*, has not survived, but has come down to us via an abridged epitome compiled sometime in the 1st or 2nd century AD, the author of which is usually referred to with the convenient moniker of «pseudo-Eratosthenes». See *Pseudo-Eratosthenis Catasterismi*, ed. A. Olivieri, Leipzig, 1897; *Eratosthenis Catasterismorum Reliquiae*, ed. K. Robert, Berlin, 1878 and T. Condos, *Star Myths of the Greeks and Romans: A Source Book containing The Constellations of Pseudo-Eratosthenes and the Poetic Astronomy of Hyginus*, Grand Rapids MI, 1997. In addition to the constellations described by Aratus, Eratosthenes provides mythological information on the *Milky Way* («*Galaxia*») and the *Pleiades* as if they were constellations. He also mentions the *Asini* and the *Praeseptum* in his descriptions of *Cancer*.

17. See *Hygini Astronomica*, ed. B. Bunte, Leipzig, 1875; *Hygini De Astronomia*, ed. G. Viré, Leipzig, 1992; Hyginus, *Poetica astronomica*, ed. A. LeBoeuffle, Paris, 1983; G. Viré, «La transmission du De Astronomia d'Hygin jusqu'au XIII^e siècle», *Revue d'histoire des Textes*, XI, 1981, pp. 159-276 and Condos, *op. cit.*

18. The Alexandrian compilation seems to have been extremely popular across the Graeco-Roman world, appearing in several different formats with varying additions and subtractions and serving as the inspiration for numerous authors and poets in both languages. A definitive version of the Aratean corpus, with a set group of texts ordered in a particular fashion, appears to have come together some time between the beginning of the 2nd and end of the 3rd century AD. No complete version of this compilation, which philologists usually refer to as 'Φ', has survived, but its contents have been largely reconstructed by combining a number of the later Greek and Latin fragments that formed a part or were derived from the original versions and grouping of texts. In the middle years of the 8th century, a version of 'Φ' was rather awkwardly translated into Latin (most often called the «*Aratus latinus*»), but almost within a generation, a revised and modified version of the text was created (generally referred to as the «*Aratus latinus recensio interpolata*» or as the «*Revised Aratus latinus*»). For additional information, see Maass, *Commentariorum*, *op. cit.*; Martin, *Histoire*, *op. cit.*, esp. pp. 69 ff. and H. Le Bourdellès, *L'Aratus latinus. Étude sur la culture et la langue latines dans le Nord de la France au VIII^e siècle*, Lille, 1985, *passim*, but esp. the conclusions on pp. 259-263.

19. Basle, Öffentliche Bibliothek der Universität, Cod. AN. IV. 18. See *Germanici Caesaris Aratea*, *op. cit.*, pp. 55-104; *Les Phénomènes*, *op. cit.*, p. xxxv-xxxvi; *Aratus Ascribed to Germanicus*, *op. cit.*, pp. 4 and 7-8 and A. dell'Era, «*Scholia Basileensia ad Germanicum*», *Atti Accademia Nazionale dei Lincei. Memorie. Classe di scienze morali, storiche e filologiche*, ser. VIII, XXIII, fasc. 4, 1979, pp. 301-371.

20. There is an extensive bibliography on this text, which has a very complicated history. For a convenient overview, see A. dell'Era, *Una «caeli descriptio» d'età carolingia* (Quaderni della Facoltà di Magistero dell'Università di Palermo. Serie di filologia latina, II), Palermo, 1974. I would like to thank Giovanni Fiori of the University of Palermo for obtaining a copy of dell'Era's text for me. More recently, see A. Borst, *Das*

Buch der Naturgeschichte. Plinius und seine Leser im Zeitalter des Pergaments (Abhandlungen der Heidelberger Akademie der Wissenschaften. Philosophisch-historische Klasse, Jg. 1994, Abh. 2), Heidelberg, 1994 (2nd edition, Heidelberg, 1995) esp. pp. 156-165 and A. Borst, *Die karolingische Kalenderreform* (Monumenta Germaniae Historica. Schriften. XLVI), Hannover, 1998, esp. pp. 312-322. The *De ordine ac positione stellarum* also reappears (almost verbatim) as one of the chapters in the *Liber Floridus* of Lambertus of St Omer.

21. The text was first attributed to Bede in the *editio princeps* of Bede's collected works, published by Herwagen in 1543, though all modern scholars (except, oddly, for Maass) firmly reject the attribution. As with the *De ordine ac positione stellarum* catalogue, the literature on the *De signis caeli* is vast. For a convenient overview, see A. Dell'Era, «*Una rielaborazione dell'Arato latino*», *Studi medievale*, XX, 1979, pp. 268-301 and Le Bourdellès, *op. cit.*, esp. pp. 82-83.

22. The recognition of two textual families can be traced back to the early 19th century. See *Novae editionis Arateorum Ciceronis, Germanici Caesaris et R.F. Avienus specimina quatuor*, ed. J.C. Orelli, Zurich, 1831.

23. The missing lines on the «O family» are as follows: vv. 255-257, 270-272, 278-280, 284-286, 315-317, 321-323, 328-330, 333-335, 341, 344-346, 356-358, 363-365, 379-381, 393-395, 414-416, 426-428, 431-432, 434-436, 440-442, 459-461 and 532-534.

24. The text is taken directly from the manuscript. The missing lines (shown within brackets) are cited from *Les Phénomènes*, *op. cit.*, pp. 23-25.

25. On the development of the codex in late antiquity, see K. Weitzmann, *Illustrations in Roll and Codex. A Study of the Origin and Method of Text Illustration*, Princeton, 1947, esp. pp. 40-108. He suggests that this format of the «column picture» is found «in the majority of those illustrated codices whose archetype existed back in the period when the [papyrus] roll was the prevailing form» (p. 72).

26. As evidence of the challenges involved in this migration process, Weitzmann notes the differences in proportion between the

two closely-related *Revised Aratus latinus* manuscripts, St Gallen, Stiftsbibliothek, Ms 902 and St Gallen, Ms 250. In the earlier manuscript (St Gallen 902), the pictures and text are distributed between two columns, thus preserving the relative dimensions found in a papyrus roll. The later copy (St Gallen 250) has fused text and illustration into one column. As a result, the column had to be widened to fill the width of the page. This then altered the proportions of the space left for the pictures, meaning that several of the images are flanked by large areas of white space on either side. See Weitzmann, *op. cit.*, p. 85.

27. See Weitzmann, *op. cit.*, pp. 118-122.

28. For the several citations from Lactantius's *Divine Institutions*, see Martin, *op. cit.*, pp. 40-41.

29. Vatican, Biblioteca Apostolica, Vat. grec. 752. For a further discussion of this phenomenon, see Weitzmann, *op. cit.*, pp. 118-122.

30. *Claudii Ptolemaei Opera quae extant omnia* [...], ed. J. L. Heiberg, Leipzig, 1898-1919. See also *Des Claudius Ptolemäus Handbuch der Astronomie aus der griechischen übersetzt* [...], ed. and German transl. by C. Manitius, Leipzig, 1912-13 and *Ptolemy's Almagest*, English transl. by G. J. Toomer, London, 1984 (repr. Princeton NJ, 1998).

31. For a discussion of the long and varied history of the *Syntaxis mathematica* and its translations, see O. Pedersen, *A Survey of the Almagest*, Odense, 1974; P. Kunitzsch, *Der Almagest. Die Syntaxis mathematica des Claudius Ptolemäus in arabisch-lateinischer Überlieferung*, Wiesbaden, 1974; F. J. Carmody, *Arabic astronomical and astrological sciences in Latin translation. A Critical Bibliography*, Berkeley CA and Los Angeles CA, 1956 and *Ptolemy's Almagest, op. cit.*, pp. 1-3.

32. Hipparchus, *In Arati et Eudoxi Phaenomena commentariorum libri tres* [...], I, IV, 5 (ed. and German transl. by C. Manitius, Leipzig, 1894, pp. 32-33). English transl. taken from *Ptolemy's Almagest, op. cit.*, p. 15.

33. Ptolemy, *Syntaxis mathematica (Almagest)*, VII, v, 2; VII, v, 4; VII, v, 9 and VII, v, 10. See *Ptolemy's Almagest, op. cit.*, pp. 342, 346, 350 and 351.

34. Ptolemy, *Syntaxis mathematica (Almagest)*, VII, v, 6; VIII, I, 30; VIII, I, 32 and VIII, I, 35.

See *Ptolemy's Almagest, op. cit.*, pp. 348, 374, 377 and 383.

35. Ptolemy, *Syntaxis mathematica (Almagest)*, VIII, III, H, 180-85. See *Ptolemy's Almagest, op. cit.*, pp. 404-407.

36. See the illustrations and descriptions in E. Savage-Smith, *Islamicate Celestial Globes. Their History, Construction and Use*, Washington DC, 1985 and S. Ackerman, «Islamic Globes» in E. Dekker, *et alii*, *Globes at Greenwich. A Catalogue of the Globes and Armillary Spheres in the National Maritime Museum, Greenwich*, ed. by K. Lippincott, P. van der Merwe and M. Blyzinsky, Oxford, 1999, pp. 177-198, esp. p. 177.

37. The most complete studies of the globe can be found in G. Thiele, *Antike Himmelsbilder, mit Forschungen zu Hipparchos, Aratos und seinen Fortsetzern und Beiträge zur Kunstgeschichte des Sternhimmels*, Berlin, 1899; V. Valerio, «Historiographic and Numerical Notes on the Atlante Farnese and its celestial sphere», *Globusfreund*, XXXV-XXXVII, 1987-89, pp. 97-123; U. Korn, «Der Atlas Farnese. Eine archäologische Betrachtung» in *Atlas. Antiquarische Gelehrsamkeit und bildende Kunst. Die Gegenwart der Antike in der Renaissance* [Bonner Beiträge zur Renaissanceforschung], ed. G. Schweikhart, Cologne, 1996, I, pp. 25-44 and H. Wrede, «Die Bürde der verpflichtenden Macht. Octavian und der Ausklang der hellenistischen Kunst», in *Atlas* (as above), pp. 45-50. The descriptions of the constellations in the first two studies, however, were compiled from unreliable secondary sources and should be treated with due caution.

38. For additional information on the 2nd century globe in the Römisch-Germanischen Zentralmuseum in Mainz, see E. Künzl, «Sternenhimmel beider Hemisphären. Ein singulärer römischer Astralglobus der mittleren Kaiserzeit», *Antike Welt. Zeitschrift für Archäologie und Kulturgeschichte*, XXVII, 2, 1996, pp. 129-133 and E. Künzl, «Der Globus im Römisch-Germanischen Zentralmuseum Mainz: Der bisher einzige komplette Himmelsglobus aus dem Griechisch-Römischen Altertum», *Globusfreund*, XLV-XLVI, 1997-98, pp. 7-153 (in German and English).

39. See Kunitzsch, *op. cit.*, pp. 173-174 and

226. See also, L. Ideler, *Untersuchungen über der Ursprung und die Bedeutung der Sternnamen. Ein Beitrag zur Geschichte des gestirnte Himmels*, Berlin, 1909, esp. pp. 42-43 and 296-98 and O. J. Tallgren, «Survivance arabo-romane du Catalogue d'étoiles de Ptolémée. Études philologiques sur différents manuscrits, I», *Studia orientalia*, II, 1928, pp. 202-283, esp. pp. 216-217.
40. The Arabic translators thought that the proper name of the constellation *Boötes* (Βούτης) was related to Βοητής («the Shouter»), having been derived from βοάω («to call» or «to shout»). See Kunitzsch, *op. cit.*, p. 175; Ideler, *op. cit.*, pp. 46-47; Tallgren, *op. cit.*, p. 217 and K. Lippincott, «The astrological vault of the *Camera di Griselda* from Roccabianca», *The Journal of the Warburg and Courtauld Institutes*, XLVIII, 1985, pp. 42-70.
41. See Kunitzsch, *op. cit.*, pp. 194-196.
42. See Kunitzsch, *op. cit.*, pp. 187-188.
43. This tradition carries over into the illustrations of the Latin Stellar tables. See, for example, Catania, Biblioteca Comunale, 87 (int. 87), fol. 11r; Cues, Hospitalbibliothek, Ms 207, fol. 128r; Paris, Bibliothèque de l' Arsenal, lat. 1036, fol. 18r and Vienna, ÖNB, cod. 5318, ff. 26v and 27r.
44. For more information on the text and illustrations of the Latin Stellar tables, see P. Kunitzsch, *Der Sternkatalog des Almagest. Die arabisch-mittelalterliche Tradition, II. Die lateinische Übersetzung Gerhards von Cremona*, Wiesbaden, 1990 and Lippincott, «*Camera di Griselda*», *op. cit.*
45. See Lippincott, «*Camera di Griselda*», *op. cit.*, esp. plates 13^a and 14^a.
46. The text in the Latin stellar tables reads «*Stellatio algieithi super genu ipsius et nominatur saltator etiam*» (cited by Kunitzsch, *Der Sternkatalog, op. cit.*, p. 52). But this is amplified in many of the later manuscripts. For example, see the 14th-century manuscript: Vatican, Biblioteca Apostolica, Pal. lat. 1377, fol. 184r (*forma et stelle algiechi quod est super genu ipsius et nominatur saltator / hercules, saltator*); the German manuscript dated 1426: Vatican, Biblioteca Apostolica, Pal. lat. 1368, fol. 51v (*forma et stelle algieithi quod est incurvati super genu ipsius et nominatur etiam saltator et est herculis*); the 15th-century Florentine manuscript of Ludovico d'Angulo's *Liber de figure seu imagine mundi*: Madrid, Biblioteca Nacional, Ms 9267, fol. 85v (*hercules, vadens super policem, incurvatus genu, alcimech*) and the English manuscript of Guido Bonatti's *Liber introductorius*, dated 1490: London, BL, Arundel Ms 66, fol. 43v (*stellatio algieithi id est incurvatus super genu ipsius seu vadens super genua fuit genuflectans et vocatur saltator et est herculis*). The fullest list of alternate names for *Hercules* appears in a Florentine version of the Alfonsine stellar tables, dated 1379: Vatican, Biblioteca Apostolica, Vat. lat. 8174, p. 18 (*E chiamasi questa figura in latino incurvatus super genu ipsius, e ancora si chiama in latino saltator. E in castellano si dice el che tien el ynoio fincado, e in fiorentino colui che e inchinato sopra 'l ginocchio suo, e ancora si chiama ballatore. E in arabico si à due nomi, l'uno elgehci ale rochetihi, che vuol dire genuflexu, e l'altro nome è raquic, che vuol dire ballatore*).
47. See Catania, Biblioteca Comunale, Ms 87 (int. 87), fol. 9r and its sister manuscript, Vienna, ÖNB, cod. 5318, fol. 23r (where the flayed skin is labelled «*pellis leonis*»).
48. Aratus, *Phaenomena*, vv. 269-71; Germanicus, *Aratea*, v. 320; ps-Eratosthenes, *Catasterismi*, 24 and Hyginus, *Astronomica*, II, VII and III, VI.
49. Ptolemy, *Syntaxis mathematica (Almagest)*, VII, v, 8. See *Ptolemy's Almagest, op. cit.*, pp. 349-350.
50. P. Kunitzsch, *Der Almagest, op. cit.*, pp. 177-178 and 237, Kunitzsch, *Der Sternkatalog, op. cit.*, pp. 56-57 and K. Lippincott, «*Camera di Griselda*», *op. cit.*, p. 50. Thābit and al-Bīrūnī offer a slight variant to this tradition, describing the constellation as *aṣ-ṣanğ wa-l-mi'zafa wa-ṣ-ṣallāq*, or «the Harp» and «the stringed instrument». A version of this term appears in the Latin translations of the *Tetrabiblos*, where Plato of Tivoli transliterates the first part of the phrase as *assange* and Aegidius de Tibaldis as *arnig*. See P. Kunitzsch, *Der Almagest, op. cit.*, p. 178, citing the edition of the *Tetrabiblos* printed in Venice in 1493.
51. Kunitzsch, *Der Almagest, op. cit.*, pp. 177-178 and 237; Kunitzsch, *Der Sternkatalog, op. cit.*, pp. 56-57; and Lippincott, «*Camera di Griselda*», *op. cit.*, p. 50.

52. See P. Kunitzsch, *Arabische Sternnamen in Europa*, Wiesbaden, 1959, p. 218; P. Kunitzsch, *Untersuchungen der Sternnamenklatur der Araber*, Wiesbaden, 1961, p. 87, n° 195a; Kunitzsch, *Der Almagest*, op. cit., pp. 177-178 and 236; Kunitzsch, *Der Sternkatalog*, op. cit., pp. 56-57 and Lippincott, «Camera di Griselda», op. cit., p. 50. The term *as-sulahfah* also appears in Abu Ma'shar's *Introductorius*, which becomes transliterated in the Latin sources as *azelfage*. See Kunitzsch, *Der Almagest*, op. cit., p. 178.
53. Ptolemy, *Syntaxis mathematica (Almagest)*, VII, v, 8. See Ptolemy's *Almagest*, op. cit., p. 349.
54. See Kunitzsch, *Der Sternkatalog*, op. cit., p. 56.
55. Ideler, op. cit., pp. 67-73, esp. p. 71.
56. Tallgren, op. cit., esp. pp. 67-75.
57. *Ibidem*, p. 73.
58. Kunitzsch, *Der Almagest*, op. cit., pp. 177-178 and 236-238 (n° 96 and 99); Kunitzsch, *Der Sternkatalog*, op. cit., pp. 56-57 and in a private communication (17. 2. 01).
59. Tallgren, op. cit., p. 73.
60. See Catania, Biblioteca comunale, Ms 87 (int. 87), fol. 8r and its sister manuscript, Vienna, ÖNB, cod. 5318, fol. 21r. In the Brussels stellar table manuscript (Bibliothèque Royale, Ms 10117-26, fol. 57v), *Lyra* appears as a small mouse with a shield-shape inserted into its tummy.
61. Basle, Öffentliche Bibliothek der Universität, F. II. 33, fol. 38r.
62. *Lyra* appears as bat in Bergamo, Biblioteca Civica, Σ. II. 2, fol. 94v; Vatican, Biblioteca Apostolica, Urb. lat. 1399, fol. 35v and Oxford, Bodleian Library, Rawlinson Ms C. 117, fol. 146v
63. Los Angeles, J. Paul Getty Museum, Ms Ludwig, XII, 7, fol. 2r; Oxford, Bodleian Library, Can. misc. 554, fol. 163v and as a flying chicken in Toruń, Nicolaus Copernicus University Library, Rps 74, fol. 156r (formerly Königsberg, Universitätsbibl., Ms 1735)
64. Vatican, Biblioteca Apostolica, Pal. lat. 1368, fol. 51v.
65. See, for example, London, BL, Add Ms 41600, fol. 46v; Paris, BNF, fr. 612, fol. 105r; Paris, BNF, lat. 7344, fol. 30r and Vienna, ÖNB, cod. 5442, fol. 127v. One scholar has suggested that the figure of the male Andromeda actually comes from the iconographic traditions associated with comic male actors in ancient Greece, and makes a not terribly convincing visual connection with depictions of actors found on 4th-century BC South Italian vases. See K.M. Phillips, «Perseus and Andromeda», *American Journal of Archaeology*, LXXII, 1968, pp. 1-23 and plates 1-20.
66. See the descriptions of the speedy Ram in Aratus, *Phaenomena*, vv. 225-30; Germanicus, *Aratea*, vv. 224-28; Avienus, *Carmina*, I, 59 and I, 508-10; Hyginus, *Astronomica*, I, I and IV, II and Manilius, *Astronomica*, II, 245.
67. See Aratus, *Phaenomena*, vv. 228-229 and 233-238.
68. See Hipparchus, [...] in *Arati et Eudoxi Phaenomena*, op. cit., pp. 56-59.
69. See the passages in pseudo-Eratosthenes, *Catasterismi*, 19; Germanicus, *Aratea*, vv. 234-237 and the scholia to Germanicus's translation edited in *Germanici Caesaris Aratea cum scholiis*, ed. A. Breysig, Berlin, 1867: the *Basiliensis scholia* (p. 81); the *Stroziana* (pp. 144-145) and *Sangermanensis scholia* (pp. 144-145) See also the descriptions in Vitruvius, *De architectura*, IX, iv; Manilius, *Astronomica*, I, 615 and note the way the descriptions carries on in the medieval sources, such as pseudo-Bede, *De signis caeli*, (Maass, *Commentariorum*, op. cit., p. 587); Hrabanus Maurus, *De computo* (Maass, *ibidem*, p. 587); and in all but one of the seven extant manuscripts of the *Liber floridus* of Lambertus of St Omer.
70. Hyginus, *Astronomica*, III, xix.
71. Hyginus manuscripts which contain the *deltoton*-bearing Ram include Cambridge, Fitzwilliam Museum, Ms 260, fol. 16r; Florence, BNC, Magliabecchiana, Ms XI. 141, fol. 62r; Milan, Biblioteca Ambrosiana, Ms T. 47 sup., fol. 54r; Milan, Biblioteca Trivulziana, Ms N. 690 (E. 83), fol. 17v; New York, Public Library, Spencer Collection, Ms 28, fol. 49r; Oxford, Bodleian Library, Ms Can. lat. 179, fol. 40v; Oxford, Bodleian Library, Ms Can. misc. 46, fol. 113r; Pavia, Biblioteca Universitaria, Aldini 490, fol. 87r; Vatican, Biblioteca Apostolica, Vat. lat. 3109, ff. 39v and 57v; Vatican, Biblioteca Apostolica, Vat. lat. 3110, fol. 71v; Verona, Biblioteca Capitolare, Ms CCLXI, fol. 79r. Not all of

these manuscripts, however, maintain the variant reading.

72. See Matteo Palmieri's, *Città di Vita* manuscript (Florence, Biblioteca Laurenziana, Plut. 40, sup. 53, fol. 41v), where he describes this part of the sky: *presso ariete in cielo ad questo stallo/deltheto porta con le corna torte/ & son tre stelle vanno quasi in ballo*. Leonardo Dati later adds a commentary to the manuscript (dated 2 June 1473). On fol. 44v, his notes record: *Sciendum hic est arietem duodecim signorum zodiaci principem contrahere in aequinoctiali circulo caput et illud intra triangulum tenere, quem deltheton vocant*. The illustration on fol. 44v shows a *deltoton*-bearing Ram.

73. For more on Basinio's Ferrarese years, see K. Lippincott, «The neo-Latin Historical Epics of the North Italian Courts: An examination of Courtly Culture in the fifteenth century», *Renaissance Studies*, III, 1989, 4, pp. 415-428, esp. pp. 418-419, with the relevant literature cited.

74. Soldati, in his study of astrological poetry of the 15th century, characterised Basinio's adaptation of Hyginus as having been done «con una così pedissequa servilità». See B. Soldati, *La poesia astrologica nel Quattrocento. Ricerche e studi*, Florence, 1906 (repr. Florence, 1986), pp. 74-104, quote cited from p. 94.

75. Basinio da Parma, *Astronomica*, III, XIX in *Basini Parmensis Poetae Opera praestantiora opportunis commentariis illustrata*, ed. by L. Drudi, Rimini, 1794, I, p. 315.

76. Basinio manuscripts which include illustrations of the *deltoton*-bearing Ram include Bologna, Biblioteca comunale dell'Archiginnasio, Ms A. 173, fol. 17r; Cambridge, University Library, Ms Dd. 4. 64, fol. 26r; London, Wellcome Institute Library, Ms 122, fol. 138r; Munich, Staatsbibliothek, CLM. 99r; Oxford, Bodleian Library, Bodley Ms 646, fol. 17r; Parma, Biblioteca Palatina, Ms Parmense 27, fol. 47v; Parma, Biblioteca Palatina, Ms Parmense 1008, fol. 9v; Rome, Biblioteca Casanatense, Ms 4059, fol. 18v; Venice, Biblioteca Marciana, Ms XII. 194 (4128), fol. 15v and the manuscript sold at Sotheby's (London), 23 June 1992, lot 72, p. 38. The one Basinio manuscript not to have a *deltoton*-bearing Ram is the copy in the Biblioteca Marucelliana in Florence, Ms C.CCLI, in which the majority of the pictures

have actually been copied directly from the 1513 Paucidrapius edition of Hyginus's *Astronomica*.

77. Compare, for example, the illustrations in the early 9th-century manuscript of the *Revised Aratus latinus*, Paris, BNF, lat. 12957, fol. 65v and the similar 15th-century version in Vatican, Bibl. Apostolica, Reg. lat. 1324, fol. 28v. I thank Betty O'Connor for bringing this detail to my attention.

78. Aberystwyth, National Library of Wales, Ms 735 C, fol. 20r. See P. McGurk, «Germanici Caesaris Aratea cum scholiis: A new Illustrated Witness from Wales», *The National Library of Wales Journal*, XVIII, 2, 1973, pp. 197-216, esp. plate III d. For a fuller discussion of the problems concerning the depiction of *Pegasus*, see K. Lippincott, «Pegasus und seine himmlischen Gefährten im Wandel der Zeiten», *Pegasus und die Kunst* (Katalogbuch für Aufstellung im Museum für Kunst und Gewerbe Hamburg, 3 avril - 31 mai 1993), eds. C. Brink and W. Hornbostel, Hamburg, 1993, pp. 36-45.

79. For the biting *Pegasus*, see Dijon, Bibliothèque municipale, Ms 448, fol. 69r; Paris, BNF, lat. 5543, fol. 164r; Pavia, Biblioteca Universitaria, Aldini 490, fol. 86r; Vatican, Biblioteca Apostolica, Pal. lat. 1368, fol. 52v; Vatican, Biblioteca Apostolica, Urb. lat. 1358, fol. 130r and Venice, Biblioteca Marciana, lat. VIII. 22 (2760), fol. 33r. For the image of *Pegasus* eating out of a bowl, see Klosterneuberg, Stiftskirche, Ms 685, fol. 77v; Vatican, Biblioteca Apostolica, Reg. lat. 123, fol. 193r and Vatican, Biblioteca Apostolica, Vat. lat. 643, fol. 89r. One might also cite the rather startling image of *Eridanus* as a wild-haired creature, apparently offering benediction to the reader. It appears in the two St Gallen versions of the *Revised Aratus latinus* (St Gallen, Ms 902, p. 96 and Ms 250, p. 505) and, again, in the ps-Bedan *De signis caeli* manuscript in the Badia at Montecassino (Ms 3, p. 190). The figure seems to have developed from more conventional images where the river god is placed behind a parapet with his plant-like cornucopia placed beside him. Taking the image in the Paris *Revised Aratus latinus* (Paris, BNF, lat. 12957, fol. 70r), for example, one can begin to understand the cross-hatching used to indicate the weave of his «plant basket»

becomes transformed into the decoration on a sleeve and the wild fronds of his plant are changed into a gesturing hand.

80. Baltimore, Walters Art Gallery, Ms W. 734, fol. 5v. See D. Miner, «Since De Ricci – Western Illuminated Manuscripts Acquired Since 1934. A Report in Two parts, Part II», *Journal of the Walters Art Gallery*, XXXI-XXXII, 1968-1969, pp. 41-115 esp. pp. 83-87 and figure 30 and Lippincott, «Camera di Griselda», *op. cit.*, p. 49.

81. Hyginus, *Astronomica*, III, 4.

82. A similarly clever «save» appears in some of the later manuscripts of the Germanicus *Aratea*. In the earlier ps-Bedan and Aratean manuscripts, there is a strong tradition of depicting the constellation of *Centaurus* with a wooden bucket or cylindrical wooden keg – the sort you expect to see suspended from the necks of St Bernard dogs – hanging from a strap on his wrist. There is nothing in the text to explain this image. It is only much later that artists,

having read the text, understood that this centaur is supposed to be the one who made the first sacrifice to the gods. His bucket or jug, they reasoned, must be a mis-configuration of the original *thurible*, or platter, used to carry sacrificial offering to the altar. And, sometime around 1470, the artists of at least two manuscripts (London, BL, Add. Ms 15819, fol. 46v and Naples, Biblioteca Nazionale, XIV. D. 37, fol. 35v) accordingly changed their pictures to show *Centaurus* carrying a properly delineated sacrificial plate.

83. For more information about ghost stars, see P. Kunitzsch, «Three dubious Stars in the Oldest European Table of Astrolabe Stars», *Zeitschrift für Geschichte der Arabisch-Islamischen Wissenschaften*, XIII, 1999-2000, pp. 57-69.

84. For an illustration and description of Cary's two globes, see Elly Dekker and Peter van der Krogt, *Globes from the Western World*, London, 1993, plates 37 and 38.

Science et magie : ces deux notions antagonistes dans notre culture contemporaine cohabitent, se chevauchent jusqu'à se confondre parfois au Moyen Âge et à la Renaissance. À ces deux termes aux contours apparemment si tranchés, on peut substituer ceux de connaissance, de description, de création voire d'action, qui permettent d'embrasser et de parcourir l'éventail de savoirs et de procédures trouvant leur pleine expression dans les arts figuratifs. Ceux-ci ne se limitent pas simplement à illustrer ou à transmettre des textes qui livreraient la clef de leurs significations. Ils constituent le terrain même de l'actualisation et de l'accomplissement de ces démarches scientifiques et magiques, la plate-forme de leurs échanges et de leur mise en tension. Léonard de Vinci est la figure emblématique et tutélaire de cette réflexion : il s'attache à une description attentive des moindres phénomènes physiques et à la conception de machines, tout en conférant à son travail artistique une dimension démiurgique, par l'exploration graphique de la matière première du chaos, des paysages primordiaux et des mystères de la nature en gestation, et par l'engendrement tout aussi artistique des formes qu'en extrait son esprit.

Les actes de ce colloque, organisé à Paris en 2002, réunissent ainsi un faisceau de points de vue où astrologie, magie (talismans, nigromancie, divination), alchimie, cabale, histoire naturelle et arts mécaniques sont convoqués en regard d'un grand nombre de réalisations artistiques dont l'analyse se trouve sensiblement renouvelée, tant sous l'angle philologique de leurs sources que sous celui de leur contextualisation et de leur interprétation, où l'instrumentalisation politique le dispute à des enjeux plus théologiques ou philosophiques, littéraires ou esthétiques.

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